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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/690,704	10/23/2003	Max Shtein	10020/29701	9763

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EXAMINER

TUROCZY, DAVID P

ART UNIT PAPER NUMBER

1762

DATE MAILED: 08/30/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/690,704

Applicant(s)

SHTAIN ET AL.

Examiner

David Turocy

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 16 June 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Arguments

1. Applicant's arguments with respect to WO 03/020999 have been fully considered and are persuasive. The 35 USC 102 (e) rejection of claim 1 has been withdrawn.

During patent examination, the pending claims must be "given the broadest reasonable interpretation consistent with the specification" by giving words their plain meaning unless the specification provides a clear definition. See *In re Prater* 415 F.2d 1393 1404-05 162 USPQ 541 and *In re Zletz* 893 F.2d 319, 321, 13 USPQ2d 1320. Therefore the examiner, giving "about equal" its broadest reasonable interpretation, interprets "about equal" to be *on the order* of the nozzle characteristics claimed, see paragraph 0033, or of the same magnitude, see paragraph 0041.

The applicant has argued against the Schmidtt reference stating the reference discloses reacting gas species in the jet, which require molecular collisions, and therefore is directly contradictory to the requirement that the nozzle diameter, the nozzle length, or the nozzle to substrate distance is on the order of the gas mean free path. While the examiner does not disagree that Schmidtt does disclose a reaction, such a disclosure does not teach away from the apparatus dimensions being on the order of the gas mean free path. As argued by the applicant, the gas mean free path of helium is approximately 0.1 mm at 1 Torr, see remarks page 9. Additionally, the examiner does not dispute that Schmidtt discloses a nozzle diameter of 2 mm, but such a disclosure is clearly not limiting and is only exemplary. Schmidtt discloses, flowing the carrier gas and a reactant species through an orifice, i.e. nozzle, which has a dimension

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of 0.2 mm (see column 26, lines 10-15), wherein such a dimension is clearly on the order to 0.1 mm. Therefore it is the examiners position, that Schmidtt does disclose apparatus dimensions on the order of the gas mean free path and maintains Schmidtt does not in fact teach away from such a modification.

The examiner notes the claim as written does not explicitly state when the gas mean free path length is measured and how such a relates to the apparatus dimensions, therefore giving the claims their broadest reasonable interpretation, the apparatus dimensions can be on the order of the gas mean free path length measured at some arbitrary pressure, such as 0.0001 Torr. In other words the claim does not state where the gas mean free path length is measured, i.e. in the nozzle, just prior to deposition, prior to entering the system. During patent examination, the pending claims must be "given the broadest reasonable interpretation consistent with the specification" by giving words their plain meaning unless the specification provides a clear definition. See *In re Prater* 415 F.2d 1393 1404-05 162 USPQ 541 and *In re Zletz* 893 F.2d 319, 321, 13 USPQ2d 1320.

The applicant is arguing against the Schmidtt reference, stating since reactions occur, which require molecular collisions, all dimensions of the apparatus are to be larger then the gas mean free path. Argument's arguments must be considered mere attorney speculation not supported by evidence. *In re Scarborough*, 500 F.2d 560,566 182 USPQ 298,302 (CCPA 1974). The examiner maintains, while reactions do occur during the process of Schmidtt, the claim does not require all the dimensions of the nozzle to be on the order of the gas mean free path and is open to one of the recited

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features. It is the examiner position that modifying one apparatus dimension to be on the order of the gas mean free path as claimed, reactions are not eliminated throughout the rest of the process, as evidenced by the apparatus dimension of 0.2 mm as discussed above. As discussed in the rejection, Stickney discloses the nozzle dimensions are a result effective variable and therefore it would have been obvious to one skill in the art at the time of the invention was made to determine the optimal value for the Knudsen number, including a Knudsen number about 1, used in the process of Schmitt, through routine experimentation, to provide a spray through an orifice, when using vacuum technology, with the desired angular distribution.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to

consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. Claims 1-3, 10, 14-18, and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent 4788082 by Schmitt ("Schmitt") in view of "Angular Distribution of Flow from Orifices and Tubes at High Knudsen Numbers" by Stickney et al, hereafter Stickney.

Schmitt discloses a process for depositing a film using a carrier gas (Abstract). Schmitt also discloses ejecting a carrier gas, hydrogen or helium, where the flow velocity is on the order of the speed of sound of the carrier gas or about one kilometer per second, which is greater than 10% of the thermal velocity of the carrier gas (Column 19, lines 59-62). Schmitt discloses depositing organic molecules to form coatings, including polymeric coatings (Column 30, lines 21-38). Schmitt discloses depositing the organic material using an atmospheric background pressure, i.e. 760 Torr, which reads on the background pressures as claimed (Column 21, lines 31-47, Column 24, lines 49-64). It is the examiners position that spraying in an atmospheric pressure environment inherently results in a pressure between the substrate and the nozzle, applicants "dynamic pressure", as claimed. Schmitt also discloses that though high vacuum systems are often complicated they are often utilized when depositing thin films (Column 1, line 66 – Column 2, line 3). Schmitt also discloses providing a depositing species with a molecular weight greater than the carrier gas (Column 11, lines 48-58).

Schmitt fails to disclose providing a nozzle diameter, nozzle length or a nozzle-to-substrate separation about equal to the gas mean free path length.

However, Stickney, discloses the angular distribution of the flow through an orifice, when using vacuum technology, is directly related to the Knudsen number, which is defined as the mean free path / diameter of the orifice (Page 10). Stickney discloses the angular distribution of the flow through the orifice becomes increasingly narrow, i.e. more directed, and the center-line intensity increases (page 16). Therefore Stickney discloses the Knudsen number decreases to 1, the angular distribution narrows and the center line intensity increases. In addition, Stickney discloses angular distribution of the spray through a tubular member is a function of the length of the tube as well as the diameter of the tube (Page 16-18). Therefore Stickney clearly discloses the relationship between the orifice diameter and the mean free path of the gas is a result effective variable.

Therefore it would have been obvious to one skill in the art at the time of the invention was made to determine the optimal value for the Knudsen number, including a Knudsen number about 1, used in the process of Schmitt, through routine experimentation, to provide a spray through an orifice, when using vacuum technology, with the desired angular distribution.

5. Claims 4-5, 6, 9, and 11-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schmitt in view Stickney and further in view of US Patent 6468605 by Shah et al. ("Shah").

Schmitt in view Stickney of teaches all the limitations of these claims as discussed above in the 35 USC 103 (a) rejection, however, Schmitt in view Stickney fails to teach providing a guard flow.

However, Shah teaches of a method for producing a high-speed jet of coating material and gaseous carrier gas (Abstract). Shah discloses providing a guard gas (24) from the nozzle surrounding the gaseous spray (Column 3, line 52-Column 4, line 6, Figure 1). Shah discloses the guard gas facilitates screening, directing, and shaping of the spray coating to provide the appropriate coating (Column 4, lines 1-2). Shah also discloses using a guard gas including argon and nitrogen (Column 4, lines 3-4). It is the examiners position that the guard gas flow, as disclosed by Shah, would inherently affect the "dynamic pressure" or the pressure between the nozzle and the substrate.

Therefore, it would have been obvious to one skilled in the art at the time of the invention to modify Schmitt in view Stickney to use the guard flow suggested by Shah to provide a desirable high speed spray coating because Schmitt in view Stickney teaches spraying, at high speeds, a coating material entrained in a carrier gas and Shah teaches providing a guard gas provides for shaping, directing, and screening of the coating material entrained in a carrier gas. Please note that the test of obviousness is not an express suggestion of the claimed invention in any or all references, but rather what the references taken collectively would suggest to those of ordinary skill in the art presumed to be familiar with them (*In re Rosselet*, 146 USPQ 183).

Claim 9: Schmitt in view Stickney and further in view of Shah discloses using a guard gas, argon or nitrogen, which has a larger molecular weight than the carrier gas, hydrogen or helium.

6. Claims 7 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schmitt in view Stickney and Shah and further in view of Kirk-Othmer Vacuum Technology "Kirk-Othmer".

Schmitt in view Stickney and Shah teaches all the limitations of these claims as discussed above in the 35 USC 103 (a) rejection, however, Schmitt in view Stickney and Shah fails to explicitly teach providing a pressure less than 0.1 Torr.

However, Kirk-Othmer, teaching of known uses of vacuum technology, discloses a high vacuum corresponds to a controlled vacuum system (Pg 750, last paragraph). In addition, Kirk-Othmer discloses using various pressures, including pressures less than 0.1 Torr, for various controlled vacuum processes (Table 1). Therefore it is the examiners position that the pressure within the vacuum is a result effective variable, which varies depending on the coating material and substrate.

Therefore it would have been obvious to one skill in the art at the time of the invention was made to determine the optimal pressure within the vacuum chamber, including less than 0.1 Torr, to deposit a thin film as disclosed by Schmitt in view Stickney and Shah, through routine experimentation, to provide the desired coating of a substrate under vacuum conditions.

7. Claims 13 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schmitt in view Stickney and Shah and further in view of US Patent 5709906 by Bickford et al. ("Bickford").

Schmitt in view Stickney and Shah teach all the limitations of these claims as discussed in the 35 USC 103 (a) rejection above. In addition, Schmitt teaches purging the system using the inert carrier gas to remove any unwanted species in the system, which might have been there when left open to the ambient environment (Column 21, lines 31-40). However, Schmitt in view Stickney and Shah fails to teach using a glove box.

However, Bickford discloses using a chamber that either can be purged with an inert gas, using an inlet tube and one-way nozzle, or the operation can take place in a glove box under an inert atmosphere (Column 8, lines 53-56). The examiner acknowledges Bickford is directed to electrochemically reducing organic compounds, however, Bickford is only utilized here to show that an inert glove box is a known substitute for purging a chamber prior using a carrier gas. Substitution of equivalents requires no express motivation. *In re Fount*, 213 USPQ 532 (CCPA 1982); *In re Siebentritt* 152, USPQ (CCPA 1967).

Therefore, it would have been obvious to one skilled in the art at the time of the invention to modify Schmitt in view Stickney and Shah to use the glove box with an inert gas atmosphere suggested by Bickford to provide a desirable inert atmosphere without

unwanted species because Schmitt in view Stickney and Shah teaches purging the spray chamber with inert gas prior to applying the coating and Bickford teaches a glove box with an inert atmosphere is a known substitute for inert gas purge of a chamber.

Conclusion

8. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David Turocy whose telephone number is (571) 272-2940. The examiner can normally be reached on Monday-Friday 8:30-6:00, No 2nd Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy Meeks can be reached on (571) 272-1423. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

David Turocy
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